The Use of Origami for Anxiety

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Albertus Magnus College

Submitted in partial completion of the requirements for the degree of

Master of Arts in Art Therapy and Counseling (MAATC)

May 2022

Institutional Review Board (IRB)
Albertus Magnus College

DATE: March 9, 2022

Dear Lily Mudre,

This letter serves as an official approval by the Albertus Magnus College IRB for you to conduct the study on "origami making and anxiety" as described in the IRB application submitted on 3/5/22. Please ensure that the confidentiality of your research participants is properly protected and that you remain within the boundaries you stated in the IRB application. If those boundaries change in relation to the study participants, please notify the IRB as an amendment may be necessary.

Your study is authorized to begin as of the date of this approval letter and is valid for one year, ending on March 9th, 2023.

If you have any questions, please contact Dr. Joshua Abreu, the IRB Administrator, by e-mail at jabreu1@albertus.edu.

Sincerely,

Joshua Abreu, Ph.D.
IRB Administrator

Acknowledgements

It is a genuine pleasure to express my deep sense of thanks and gratitude to the following who were fundamental in the creating of this thesis:

Advisor: Rebecca Arnold, Ph.D., ATR-BC, CLAT

Interim Director

Associate Professor and Clinical Coordinator

Albertus Magnus College

Advisor: Stephen Joy, Ph.D.

Chair, Department of Psychology

Professor of Psychology

Albertus Magnus College

Reader: Ragaa Mazen, Ph.D.

Curriculum Consultant

Former Director of Masters of Science in Human Services

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Additional thanks to Abbe Miller, Ph.D., ATR-BC, LPC, all the individuals who participated in the study and my friends and family for their unwavering support during this process.

Abstract

Research has indicated that origami may be an effective technique that utilizes repetition and mindfulness qualities to decrease anxiety. The present research examined the efficacy of a one-time origami intervention as a means for lowering state anxiety. An adult population (N = 30) were pseudo-randomized in either a guided origami crane making condition or a control magazine reading condition. Anxiety was measured pre-post using the State Trait Anxiety Inventory, using only the State scale. Data analysis showed that there were no statistically significant changes in levels of anxiety pre to post. In addition, there were no significant differences reported between the control group and experimental group in anxiety levels. The data did not prove significant, however did trend towards origami reducing state anxiety. Thoughts for future research are addressed.

The Use of Origami for Anxiety

Anxiety is an emotion often accompanied by feelings of fear, nervousness, worry, perseverative thoughts, and tension. Physical symptoms may include sweating, rapid heartbeat, or increased blood pressure (American Psychological Association, 2021). When day-to-day functioning is significantly impaired by consistent levels of anxiety, there is a possibility that an anxiety disorder will be diagnosed (The National Center for Complementary and Integrative Health, 2018).

A great deal of research in the fields of psychology and art therapy has focused on methods to alleviate symptoms of anxiety. A consensus group consisting of 36 experts produced a systematic review of randomized controlled trials on anxiety disorders (N = 403) to produce evidence-based recommendations for the treatment of anxiety disorders (Bandelow et al., 2015). The use of pharmacological drugs and or psychotherapy were found to be effective, while Cognitive- Behavior Therapy (CBT) was found to lead interventions on effectiveness.

Cognitive Behavior Therapy has been researched for children with anxiety disorders (Neumer, 2018). Participants (N = 165) were randomly assigned to one of three conditions: individual cognitive-behavioral therapy (ICBT), group cognitive-behavioral therapy (GCBT) or a waiting list control group. The interventions lasted for 12 weeks. The Multidimensional Anxiety Scale for Children (MASC) was used as the outcome measure. Significant improvements for those in both the individual cognitive-behavior therapy and group cognitive-behavior therapy. The control group showed no significant change. The results of the study showed that CBT is an effective treatment of anxiety in both individual and group settings.

Additionally, some current treatment trends for anxiety have explored the mind-body connection by using repetitive practices such as mindfulness which can include the use of

mantras or breathing techniques. Mindfulness involves purposeful attention to the present moment with an emphasis on accepting things for what they are without trying to change them. Mindfulness practice involves accepting feelings, thoughts, and bodily sensations through openness, curiosity, and a non-judgmental attitude (Academic Mindfulness Interest Group, 2006). In an empirical research study, Helene and Ford (2000) applied mindfulness practices with primary care patients who suffered from emotional and stress related complaints. A six-week program was led by a multi-faceted group of healthcare providers of physicians, psychologists, nurse practitioners, physician assistants and clinical social workers. The mindfulness-based treatment (MBT) used exercises designed to focus on self-awareness and daily meditation. Each week, six two hour classes were led by a trained facilitator and followed up with a workbook and a meditation audio-tape for home use. Data was collected using the Medical Symptoms Checklist (MSCL) and Brief Symptom Inventory (BSI). These measures were administered on site before and after the course, and by mail, six months after as a follow-up. Data analysis showed that there were significant reductions in overall psychological distress as well as a significant decrease specifically in anxiety, after completing the mindfulness-based program. The improvement in mental health issues were suggested to have considerable positive effects on the individual's overall well-being.

According to Benson, 2001 other meditative techniques also use repetition, such as breathing, mantra prayers, yoga, progressive muscle relaxation, jogging, and even knitting. These have all been linked to the *relaxation response*. The relaxation response is a "physical state of deep relaxation which engages the other part of our nervous system—the parasympathetic nervous system" (Benson et al., 1974, p. 37). The practice of repetitively using the mind in an intentional way to prompt the relaxation response has led to quantifiable and

predictable physiological changes that may be useful in offsetting common anxiety symptoms such as decreases in their breathing rate, metabolism, and brain wave frequency (Benson, 2001).

Yoga, a mind-body based practice, in which body movements can be repeated, has also been utilized in the treatment of anxiety. Hardoerfer and Jentschke (2018) conducted a randomized control study comparing yoga therapy to a control waiting list group. The participants consisted of cancer patients with mixed diagnoses. The General Anxiety Disorder (GAD-7) scale was used to measure anxiety symptoms in the participants (N = 70). The study lasted for eight weeks with weekly 60 minute sessions of introductory light yoga. The results indicated significant reduction in anxiety after the eight-week yoga in comparison to the control group. This data suggests that a body-based practice, such as yoga, can be a useful tool in the treatment of anxiety.

Having similar qualities to yoga, mantra repetition is supported as an intervention to manage psychological distress including anxiety. Bormann et al. (2006) conducted a randomized controlled trial (N = 93) to investigate the effects of mantra repetition in HIV-positive adults. The purpose of this study was to investigate the effects on psychological distress (stress, anxiety, anger, depression, intrusive thoughts), quality of life enjoyment and satisfaction as well as existential spiritual well-being. The participants were randomly assigned to either the control group (n = 47) or the experimental group (n = 46). The experimental group was provided information on choosing a mantra and taught strategies to enhance mantra repetition such as one-pointed attention and mindfully engaging in one task at a time. The group was asked to select a word or phrase to repeat silently throughout the day when feelings of psychological stress occurred. The control group was provided with video tapes about HIV-topics and engaged in group discussion. No specific skills or stress management training was provided. The

experimental group showed significant positive results compared to the control in decreasing anxiety and increasing overall well-being. Suggesting that repetition is conducive to decreasing anxiety. Further, Bernardi et al. (2001) conducted a study on the palliative effects of repetition using rosary prayer and yoga mantras. A group of 23 healthy adults were monitored at their baseline, reciting the Ave Maria prayer, the yoga mantra "om-mani-padme-om." free talking and controlled slow breathing. The recordings were obtained in random order. The effects produced positive results for mantra repetition and prayer. Of particular note were the healthy changes in heart function such as enhanced heart rate variability, slowed respirations, and increased baroreflex sensitivity. These findings support overall healthy life changes and show that the use of repetition is beneficial in decreasing of the physical symptoms of anxiety such as increased heart rate and respiration.

Additionally, non-verbal practices, such as art therapy have been used to address symptoms of anxiety. According to the American Art Therapy Association (2022), through numerous methods, art therapy engages the mind, body and spirit in ways that are unique from verbalization alone. Art therapy is a mental health profession used to improve the mental, emotional, and physical well-being of individuals across all ages through artistic expression.

Current research in the field of art therapy has focused on relief for anxiety symptoms. Specific art therapy techniques have empirical evidence to support their usefulness in decreasing anxiety. For example, Lynch (2015) conducted an arts-based intervention to measure the effects repetition in art making had on anxiety. Young adults ($N = 64$) were randomly assigned to one of three conditions of repetitious dot making as an art therapy technique with the expectation that this process would decrease anxiety. The first group was provided with a blank piece of paper, the second a paper with a pre-drawn circle and the last group received a paper with a pre-drawn

circle with a grid. The results of the study supported all three interventions as effective in significantly decreasing state anxiety as measured by the State Trait Anxiety Inventory (STAI). These results suggest that dot making as an art therapy technique is an effective means to decrease state anxiety, due to the repetitive nature suggested above. This concept calls for further research in the field to support these findings.

Prior to Lynch's study, a notable pilot study was conducted to research the effects of non-directive art making on anxiety (Sandmire et al., 2012). The researchers hypothesized that participants who engaged in an art-making activity of their choice would experience a significant reduction of anxiety in comparison to a control group that did not participate in art making. Anxiety was measured using the STAI. A sample of 57 undergraduate students were asked to participate during a high stress time, the week before final examinations. The participants assigned to the experimental group were able to choose among five art making activities: painting or coloring pre-designed mandalas, free-form painting, collage making, still life drawing and modeling with clay. The control group was instructed to sit in comfortable chairs with no formal activity instructed. Data analysis with two-tailed paired and unpaired t-tests found that there was a significant reduction in state of anxiety among those who participated in art-making activities. In contrast, the control group showed no difference between pre and post STAI scores. The outcome of this study supports that a period of brief-art making shows a measurable decrease in state anxiety.

The previous studies suggest there may be a difference between a structured art therapy intervention and a more open art-making process. Cross and Brown (2019) examined the effects on anxiety using art activities that were either structured or non-structured hypothesizing that all art activities would significantly reduce anxiety and improve affect. However, they expected

greater reductions in anxiety when participants engaged in structured versus non-structured activities. Seventy-seven participants were randomly assigned across three conditions; coloring a mandala (structured), free drawing (non-structured) or a focused breathing exercise. Marteau and Bekker's six-item short-form of the state scale of the State–Trait Anxiety Inventory was used as a pre-post measure of change in anxiety states (STAI-S). Both a multivariate analysis of variance (MANOVA) and paired sample t-tests were used to analyze the data. Results demonstrated that both the structured and non-structured activities showed significant improvements in the outcome measures of anxiety. However, no significant differences were found between the structured and non-structured art making activities. The findings reinforce that both coloring a mandala and free drawing are effective means to lessen anxiety.

Acknowledging the relevance of meditation in anxiety reduction, Curry and Kasser (2005) conducted an experiment to explore the effectiveness of structured and non-structured art activities in the lessening of anxiety by integrating elements of both art therapy and meditation. The study consisted of 84 college students randomly assigned to one of three conditions: coloring a geometric pattern, coloring on a pre-drawn mandala, or coloring on a blank sheet of paper. The participants, prior to art making were asked to complete a writing prompt that served to induce a feeling of anxiety then were administered a modified version of the STAI (14-questions). After the art making concluded, the modified STAI was administered as a post-test. The results revealed that those who colored a mandala, or the geometrical pattern, showed reduction of anxiety levels. Those who colored on the blank sheet showed no significant change. Researchers concluded that the structural components of the circular mandala and plaid geometrical shape encouraged a meditative state that may have aided to focus participants; thereby decreasing anxiety levels.

More recently, Khademi et al. (2021) carried out a study to investigate the effect of meditative coloring on the anxiety of hospitalized COVID-19 patients. The participants (N = 70) were randomly assigned to an intervention group or control group. The group that received the interventions spent 30 minutes per day for six uninterrupted days engaging in pre-made mandala coloring. The control group received routine care with no additional interventions. The STAI was used as a pre and post-test. Using data analysis, the study results showed a statistically significant decrease in mean anxiety score of the intervention group compared to that of the control group. The study findings support that 30 minutes of mandala coloring daily was successful in decreasing anxiety in this population.

Individual art making experiences have been supported in the research to be valuable in decreasing anxiety (Cross & Brown, 2019; Curry & Kasser, 2005; Khademi et al., 2021; Lynch, 2015; Sandmire et al., 2012;). On the contrary, research by Aaron et al. (2011) investigated the effects of art making on a population of undergraduate college students in group versus individual art making. The participants (N = 90; 29 male; 61 female) were randomly assigned to one of the three various conditions: group art project, individual art project and a non-art project. The results of the research suggested a significant decrease of state-anxiety in both the individual and group art interventions as compared to the non-art condition. The non-art condition showed no significant changes in state anxiety from pre to post tests. The data continues to support art therapy as an effective tool to decrease anxiety whether through individual or group art-making.

There are naturally mindful qualities to art making since it allows for introspection and sensory awareness. Art making activities have been shown to provide many benefits of enhancing relaxation by encouraging focus on the present moment. This also helps to minimize aversive reactions. Mindfulness-Based Art Therapy (MBAT) combines the benefits of

mindfulness-based stress reduction and art therapy directives (Rappaport, 2014).This theoretical orientation highlights the link between the body and mind and how mind based processes such as thinking and feeling are rooted in one's sensory and motor experiences (Beerse et al., 2020). In a five-week study conducted at a public university, the authors compared the effects of MBAT intervention with a Neutral Clay Task (NCT) by measuring anxiety, perceived stress, and salivary cortisol outcomes (Beerse et al., 2020). The measures used were the Perceived Stress Scale 10-item (PSS-10) and the Generalized Anxiety Disorder 7-item (GAD-7). Each module for the MBAT art group condition consisted of brief mindfulness practices like yoga or meditation and an MBAT art directive using earth-based clay. The control group participated in a non-guided practice of interacting with clay. The results of the study found that there were significant reductions in anxiety and perceived stress in the MBAT group. The results show that the addition of mindfulness to a practice is beneficial in anxiety reduction.

Furthermore, a randomized eight-week control trial of MBAT was conducted on a sample of 111 women with varying cancer diagnoses (Monti et al., 2006). The sample was paired by age and randomized to either the eight-week intervention or a waitlist control group that received no intervention. Each week a mindfulness skill was introduced with a mindful art activity to the experimental group. Various art techniques were used such as self-picture assessment (SPA), creative problem solving through art and collage making. The Symptoms Checklist Revised (SCL-90-R) was used as the pre- and post-test measure. The study results showed significant decrease in symptoms of distress and significant improvements in key aspects of the health-related quality of life. Within the subscales the data reflected significant decrease in anxiety among participants. The decrease of anxiety supports the use of combination mindfulness and art therapy in high stress populations.

In addition to integrating meditative practices with art therapy techniques, it is also essential to focus on the use of specific art materials that may facilitate relief from anxiety. Although paper is commonly used in art therapy to draw or paint on, paper folding techniques have increased in popularity for their perceived therapeutic benefits. A structured and ancient paper folding technique, Origami, originated in the far East, and has been integrated into therapeutic practices such as art therapy. Origami is a combination of two Japanese words including "ori" which means folding and "gami" which is the term for paper (Georgia Institute of Technology, 2021). Origami's origins can be traced back to ancient Japan and China dating around 105 A.D. with the invention of paper (Massara, 2019). The art form originally was reserved for the privileged due to the price and availability of paper during that time, functioning as a cultural part of ceremonial activities in weddings and central in the exchange of gifts in Asian communities. As paper became more affordable, the art of origami became more accessible to the masses. While often adapted into western cultural activities, it is important to recognize the historical and cultural roots of origami.

Paper folding may also incorporate repetitive practices that are similar to many of the interventions already mentioned. Chen (2006) used paper folding as a technique for teaching and learning, acknowledging that it had also been implemented as a physical and cognitive exercise (Levinson, 1976; Shumakov & Shumakov, 2001). Chen (2006) described the use of origami as it was utilized to teach mathematics to deaf and hard of hearing students. The author found that the more concrete learners were able to utilize the tactile process of origami paper folding to further enhance their understanding of mathematics. It was suggested that the practice of origami not only allowed for the students to feel empowered by independently producing a product, but also had connections in mathematics that allowed the children to develop their analytical and critical

thinking skills by exploring spatial relationships of three-dimensional objects, congruences and angels of geometry.

The applications of origami are further explored by Shumakov and Shumakov (2001) who created the Folding-Method based upon the art form of origami. The folding method is a set of modules that begin with basic folding and progress in complexity. The researchers posited that their paper folding technique would enhance the development of psychomotor functioning and increase cognitive abilities for both children and adults. A total of 137 children participated in the study in which the experimental group received origami lessons once a week for twenty-five weeks during the school year. The control group received no intervention. The researchers used a wide array of methods to collect their data. Each participant was tested pre and post intervention. Their research demonstrated how this Folding-Method could be used as a means to activate both right and left hemispheres of the brain and further develop fine motor skills in the hands. Additionally enhance development of intelligence; activate creative thinking; and support development of spatial imagination and visual accuracy. Furthermore, the researchers suggested that this method could be applied towards therapeutic purposes as a means to increase psycho-emotional development, decrease discomfort, and enhance functionality.

Perhaps most familiar in the West, origami has been linked to the Japanese cultural message that cranes created by folding paper symbolize peace and home. Various hospital programs have used origami techniques to create artworks that have then been displayed in their halls and outdoors in nature. Several anecdotal examples exist in the literature, for instance one healing arts program at a hospital that specialized in cancer treatment invited a collaborative process between patients, staff, and visitors. The research resulted in the creation of 1,600 origami cranes that were exhibited in and around the hospital. The event was inspired by a

Japanese legend which states: *make a thousand cranes and you will be granted a wish* (Lockhart & Anania, 2011). It was reported that the process of creating the paper cranes was positively experienced, while many participants expressed that they felt a degree of comfort within the art making process. The calming effects of origami may be applicable in brief-art making interventions to positively change an emotional state. Edwards and Hegerty (2018) completed a qualitative study in a private community mental health clinic in Queensland, Australia that showed positive results utilizing origami and mindfulness. The longitudinal study focused on a 15-week group process with adolescent girls who had been diagnosed with mental health issues. Participants met once a week for an hour and a half. Each week involved a check-in and an origami activity. Pre and post six-item surveys were administered measuring: levels of stress, anxiety, tiredness, motivation, comfort around other group members and relaxation using a five-point rating scale. Results indicated an increase in relaxation and motivation, and a decrease in stress and anxiety. This study showed overall positive results for the use of origami in art therapy with this population. The researchers concluded that art making, specifically origami, acted as a means for the young people in this group to engage in mindful practices. Relaxation, sensory awareness and focus on the current moment were heightened while reducing the undesirable reactions such as discomfort, boredom or restlessness (Edwards & Hegerty, 2018).

The use of origami in art therapy is further supported by the Expressive Origami Therapy theory (EOT) developed by Kobayashi (2007). The author, originally from Japan, developed the EOT theory that utilizes origami as a main mode of art therapy. Suggesting it can be applied to a multitude of settings and populations such as traumatic childhood experiences, group and individual work in the field of mental illness. More specifically through the author's work with individuals after the 9-11 attacks in the U.S. Kobayashi stressed that origami encouraged

communication with others beyond the limitations of language. The author further identified that EOT as an art therapy application parallels the four stages needed to process trauma: avoidance, alteration, acceptance, and adaptation (p.110). Using the art form of origami was concluded to be a skill that could assist with problem solving. The positive actions inherent in the process could be used to build resilience both cognitively and emotionally which may lead to overall improvement of an individual's well-being.

The use of origami invites repetitive paper folding as a suggested meditative practice offering a potential technique for relieving anxiety. Due to the limited research into applications of paper folding for anxiety reduction in the art therapy literature, this present proposed study will examine paper folding practices as a beneficial art therapy technique. It is hypothesized that participants who create origami art will demonstrate a greater decrease in level of state anxiety than those who are in a control group.

Method

Participants

The sample of convenience is comprised of 30 adults ranging from 18 to 72 years old, the mean age of participants is 30.57. Participants were recruited from a small private college in New England and surrounding areas, using flyers (Appendix A) and social media, with an anticipated snowball effect. In addition, recruitment took place at an on campus "Experiential Learning Day". The sample is composed of 13 males, 15 females and 2 self-identifying as genderfluid and non-binary. The majority of participants identified as White/Caucasian at 23 people, 5 people as Hispanic/LatinX, and 2 participants as African American/Black. Seven people reported frequently creating art, 10 occasionally, 10 rarely and 3 never creating art. More

than half of the sample had not engaged in origami prior to the study; 18 people said they had never created origami, 10 rarely, 1 occasionally and 1 frequently.

Measures

State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory (STAI) is a 40-item self-report measure developed by Charles Spielberger. The inventory in its entirety measures both state and trait anxiety. However, this proposed study will apply only Form Y-1 measuring state anxiety, because a one-time intervention is unlikely to impact trait anxiety. Form Y-1 has 20-items that request the participants to rate how they feel right now on a 4-point Likert-type scale. The responses range from "not at all" to "very much so".

The STAI has been found to have strong validity and reliability (Metzger,1976). A group of 71 college students were assigned to take the STAI after a stressful event and the control group with no event. The STAI was highly reliable in differentiating between high and low stress situations. The STAI has been further supported by Gros et al. (2007) to be reliable, which had found the internal consistency (mean r> .89) and test-retest reliability (mean r=.88) to be good. The STAI has been translated into more than 30 languages and was used in over 3,000 studies, making this an appropriate measure for this current proposed study.

Materials

Participants in the origami creating condition were provided with 60 GSM Taro's Origami Studio brand paper: three colored origami paper 6 in. (15.24cm) and three white origami paper 6 in. (15.24cm). The control condition was provided a magazine to read of their choice from the three supplied options: *Better Homes and Gardens*, *People* or *Bon Appétit*.

Procedure

The location of the meetings took place in one of two locations: a college campus classroom or local library conference room. Participants were pseudo randomly assigned to one of two conditions: origami art making or a control group that will be reading magazines. The study was be conducted in small groups ranging in size from two to four participants. The first participant was randomized to a condition based on a coin toss, and subsequent individuals were placed in alternate conditions. Upon arrival for the experiment, each participant was be given two copies of an informed consent form (Appendix B) and an image release form (Appendix C). Participants were asked to sign one copy of each form and return them to the researcher, retaining the other copy. The signed documents were coded and stored separately from the other study materials to protect confidentiality.

Participants were then be administered the STAI Form Y-1 as a pretest. Once returned, those in the art making condition received the prepared materials. Participants making origami cranes were prompted to choose a piece of origami paper and then given directions for the folding via a video clip on a laptop supplied by the experimenter or on their personal device. The step-by-step video instructions (Appendix F) lasts six minutes and forty-one seconds and allowed for the same directions to be given to each participant. Each participant was allowed to pause and rewind the video as needed. The experimenter was present to provide assistance as needed. Twenty minutes was be given for art making. Participants were allowed to make as many origami cranes as they wished during that time.

Participants in the control group were asked to sit and read a magazine for 20 minutes. They were offered a choice between three current magazines: *Better Homes and Gardens, People or Bon Appétit.* After 20 minutes all participants were administered the STAI FORM Y-1

as a posttest, followed by distribution of a demographic form (Appendix D) and debriefing statement (Appendix E). At this time participants were allowed to ask questions and engage in brief discussion about their experiences. Photographs were taken of the artwork from individuals who have signed image release forms, and participants were able to take their origami cranes with them.

Results

Paired sample t-tests were run to compare STAI scores before and after the intervention in each condition for change in state anxiety (Figure 1). Results did not support the hypothesis but does lean towards the expected direction. There was no statistically significant decrease in state anxiety for the origami creating group before (M = 36.27, SD = 9.83), compared to after art making (M = 32.60, SD = 7.57), $t(14)$= 1.57,p = .140. Changes in state anxiety within the non-art making group that read magazines did show a significant decrease in state anxiety before treatment (M = 36.07, SD = 8.78) compared to after treatment (M = 32.47, SD = 7.47), $t(14)$ = 3.03, p = .009. The mean amount of change was almost identical across conditions, but there is more variability present in the pre-test STAI scores for this group, thus making it more difficult to see change between scores pre to post.

Additionally, an independent samples t-test was completed to compare the amount of change between groups (Figure 2). The results showed no statistically significant difference between the control group (M = 3.60, SD = 4.6) compared to the experimental group (M =3.67, SD = 9.07), $t(28)$=-.02, p = .980.

Discussion

This present study investigated the effect of origami as a one-time intervention to improve state anxiety. A psychological instrument was used to establish state anxiety levels before and after the intervention. It was hypothesized that individuals who created origami would demonstrate a greater decrease in state anxiety than those who were in the control group. After completing data analysis, the results showed no significant decrease in state anxiety after creating origami, in addition there were no significant differences between the control and experimental group. Although there was no statistically significant difference between the pre and post anxiety scores of those creating origami, the results do lean towards the expected direction. There is one specific factor that could account for these results.

Many participants had not created origami prior to the study. Learning a new skill has the potential to accompany frustrations in the beginning. For instance, several participants experienced observable frustration while creating the crane. In particular, two of the participants had to stop multiple times to rewind the instructional video and tried several ways to fold the paper as instructed (see figures 3 and 4). Paralleling this experience, both participants also showed an increase in their post test scores related to their state anxiety measures. A third participant who was also creating origami for the first time was completely unable to complete a folded crane. This individual's state anxiety score increased by a mere three points from pre to post, and they also declined to have a picture taken of their final product. Although instructions were followed and some noticeable products were made, these specific individuals may have perceived their attempts as unsuccessful which may have been the reason for their changed scores and increased anxiety.

The highest increase in anxiety was in the case of one participant whose scores increased by twelve points from pre to post. Figure 3 appears slightly crumpled with more texture, possibly due to the multiple folding attempts. In addition, this image has a smaller head and tail with a larger body and wings than what would be considered proportionally accurate. The entire piece appears positioned in a defensive manner with the wings perched as if it might be taking action or flight. It is suggested that both the process of making the crane and the final product parallel the increase in anxiety that was elicited in the data.

The second highest change was four points. Figure 4 similarly shows texture on the paper as a possible indicator of multiple folding attempts. This participant specifically had difficulties with the online delivery format and required help from the investigator to navigate the pause and play of the instructional clip. The participant had expressed that they are a teacher and were delighted to learn a new activity to share with their class. At the conclusion of the art making, they expressed that this activity was too difficult for them and would not be able to teach this to their class. As observed in figure 4, the head of the crane was large in proportion to what may be considered proportionally accurate. The tail has additional folds not present in the model. Overall the product was very similar to the crane presented in the informational clip, but the participant did not feel satisfied with their work. Both the process of creating the crane and not feeling confident in the product created may have been factors in the increase of anxiety scores.

To the contrary, Figure 5 shows a decrease in anxiety from pre to post-test by seven points. Although this was the participant's first time creating origami, they were very verbal about enjoying the process of making the crane. Notably, this individual appreciated the step by step instructions and found the task very "stress relieving." Along with decreased anxiety, excitement was also expressed with plans to create more origami at home. This final product has

very crisp, purposeful folds and appears very neat suggesting a connection between the enjoyment of step by step instructions and the orderly quality of the folds. The participant was also able to recreate the steps as modeled in a manner they felt successful. The perceived accurate product may have been able to counteract the frustration of developing a new skill and result in a decrease of anxiety.

Among all of the participants in the art making group, the highest reported decrease in anxiety was that of a participant who was well versed in the art of origami. This individual was able to create the paper crane from memory (figure 6). The folds are crisp, the head and tail are clearly differentiated. The crane shows a level of mastery by personal style aspects present in the twist on the tail of the crane and the expanded body. The participant was visibly pleased while creating the origami and was engaged in conversation with the investigator. The familiarity of the task in combination with a successful product may have provided comfort and accounted for the large decrease in state anxiety for this participant.

The second highest decrease in state anxiety scores was by thirteen points in the crane depicted in figure 7. This participant reported having a small amount of experience creating origami prior to the study. The crane produced is very precise with pointed folds and is in portion accurately to the model. Again there is seen the successful product is connected to decrease of anxiety score. In contrast, no change was evident from pre to post anxiety scores from the participant who created the origami crane in figure 8. This crane has elements of precision in the overall shape of the crane but there is also a crumpled texture in the under neck to head portion as well as the tail associated with frustration in other participants.

The results of this study suggest that not only learning a new art form, but also not having a product to feel proud of may cause an increase in anxiety or show no change in state anxiety

levels. However, when creating origami cranes, most participants in this study reported a decrease in anxiety symptoms overall. These results concur with the literature in that they were not as significant as projected, but trend towards a decrease in state anxiety are suggested. It is noteworthy that both Helene and Ford (2000) and Hardoerfer and Jentschke (2018) implemented their studies over a six week and eight week period, respectively. Because their study participants showed a significant decrease in anxiety scores, it is suggested that a one-time intervention did not provide enough time for skill development which may have provided more enjoyment. Furthermore, Bormann et al. (2006) and Bernardi et al. (2001) focused on the idea of repetition as a quality that has supported a decrease in anxiety. Repetition not only within the folding technique itself, but perhaps repetition of the activity as a whole. Creating origami to develop a meaningful skill over time could invite a meditative practice that aids in the reduction of both state and trait anxiety.

Not only has origami been found to decrease anxiety symptoms in clinical application evident in research by Edwards & Hegerty (2018) and Kobayashi (2007), but also origami offers high accessibility as a creative avenue for therapy. Additionally, origami requires a minimal amount of materials which meets challenges in budget restraints, storage concerns, or space availability. There is no cutting required so sharps are not an issue, and the materials are easily transported from room to room depending on the treatment setting. Moreover, no imagery other than a product example and directions are needed. Limited imagery may be helpful in art therapy with at risk populations who are easily triggered. These factors suggest origami as a beneficial art therapy technique.

Origami, as a therapeutic tool, may provide a lesson in stress tolerance. It is a safe, controlled activity that is very structured in nature which may benefit clients who are navigating

substance abuse, eating disorders or anger management. The process can be stopped and restarted at another time, and invites metaphor around taking the challenges of life one step at a time. It may be frustrating to try to accomplish the end goal right away, but taking each step one fold at a time can provide clients with a parallel process that mirrors their own lives. By modeling this concept through their art making, clients can potentially apply it to their personal lives as well.

A major limitation of this study was the individual learning curve for each participant as some had created origami previously while others had never had this experience before. It may have been beneficial to first teach common folds to develop comfort with the process before presenting the video instructions to make the crane. Furthermore, a more supported interaction with the materials through a hands-on approach to learning may have benefited participants who became visibly frustrated. This study only focused on the act of folding on state anxiety, but did not include the therapeutic functions inherent in the art therapy profession. It may have been helpful if the researcher not only showed each folding step at a rate consistent with the learning style of each participant, but also provided physical support and relational interactions as needed. However, although therapeutic interactions were missing from this study, there were still several participants who found success and anxiety reduction through the simple use of the materials that were provided.

Confounds that may have skewed the data include the background music that played with the instructional video. Some chose to have the music play while others chose to have it off while they created their folded crane. Future research might include music as a variable in whether the origami process with or without music has a significant impact on state anxiety levels. The amount of interaction with the investigator may have also skewed the data and might

be another important variable to consider in future studies. Several participants engaged in conversation and asked questions as they worked, while others did not speak at all during the activity.

For future research, it would be compelling to increase the amount of times origami is created within a consistent group (for this study some groups consisted of strangers while others participated in groups of people that they knew). Further research may also consider monitoring of physical responses such as heart rate and blood-pressure which are often associated with anxiety (American Psychological Association, 2021). Examining these levels before, during, and after the art making may provide data on the proposed connection of origami being an art form that induces Benson's relaxation response (2001, 1974).

In conclusion, although the results were not statistically significant, this study showed positive results of origami on state anxiety as a one-time intervention for many of the participants. Given that anxiety is such a widespread occurrence, a technique that requires limited materials and provides structure with positive outcomes is hugely beneficial to the art therapy field. This study suggests more research is required to fully understand the effects of origami on state anxiety and its various possible applications for treatment.

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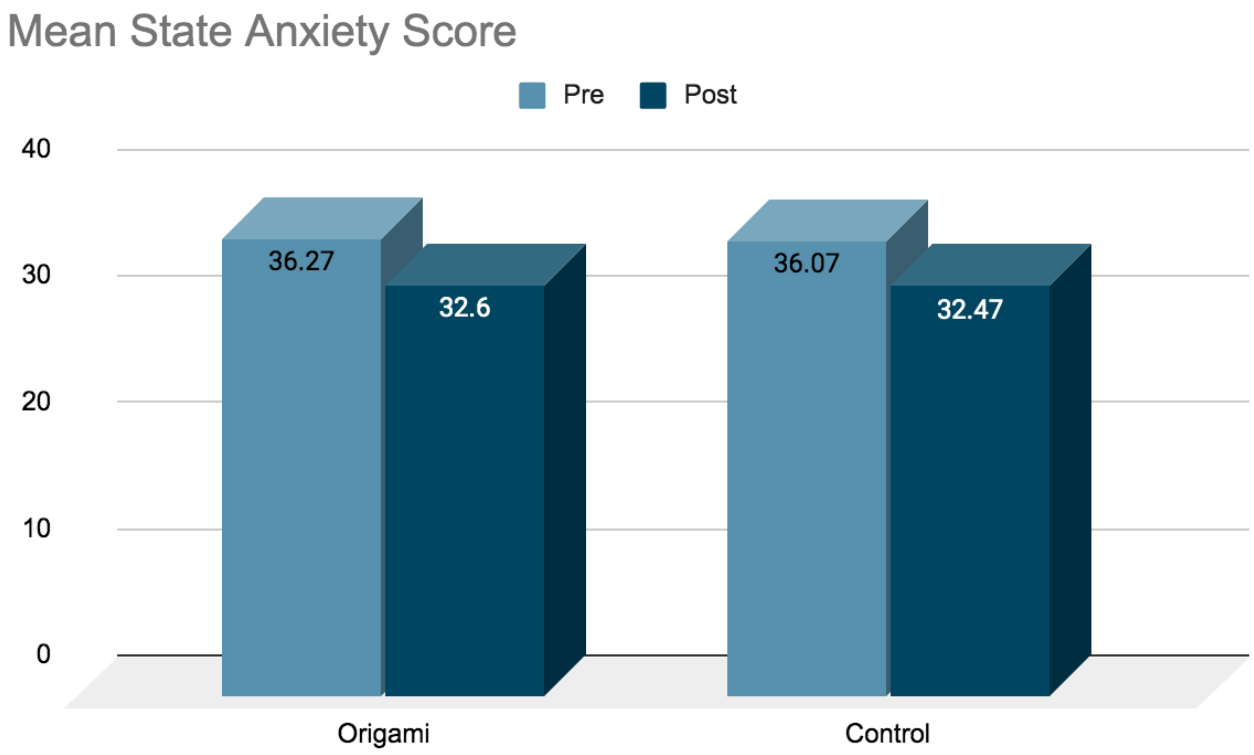
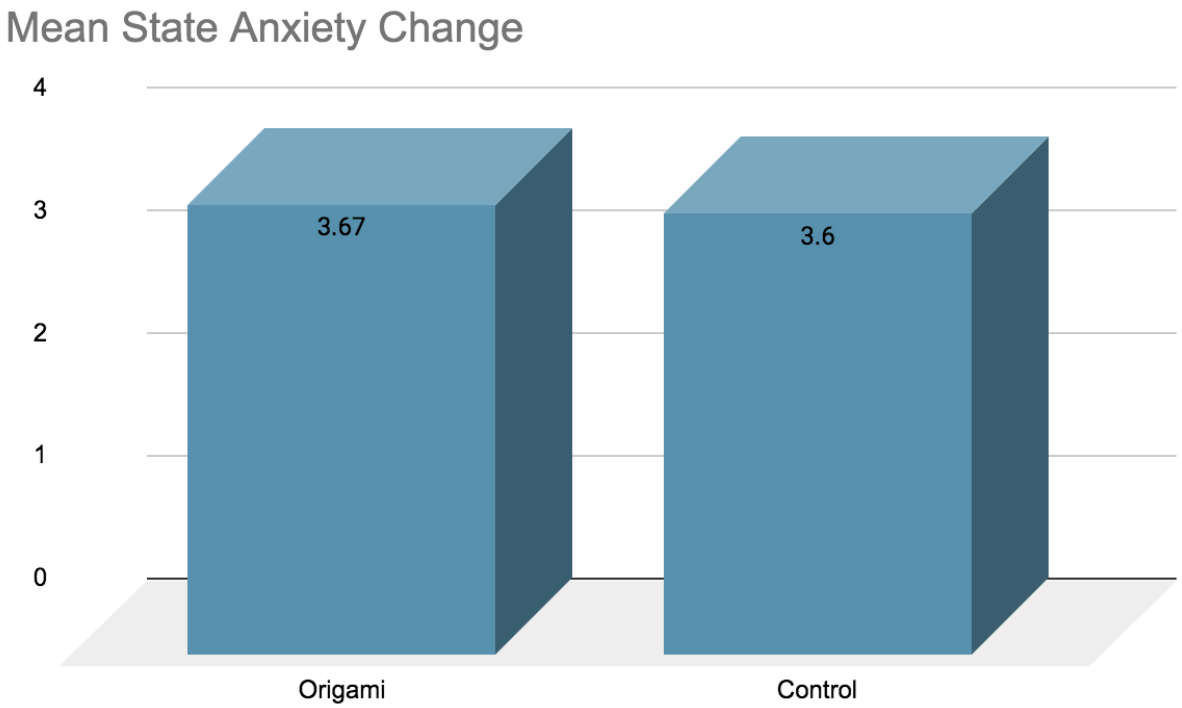
Figure 1



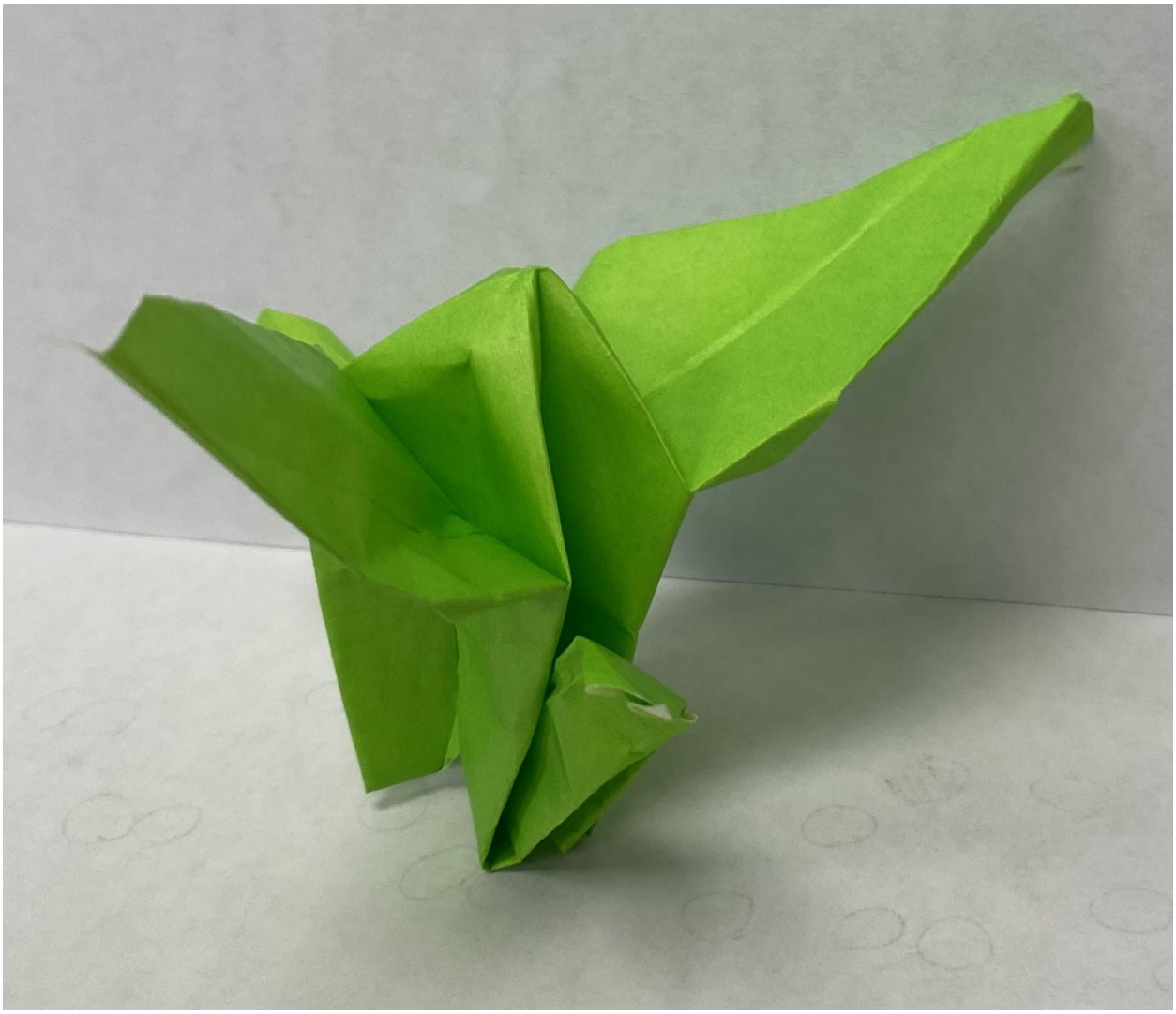
Note. This figure compares pre and post means of state anxiety scores between the group that created origami and the control group that read magazines.

Figure 2



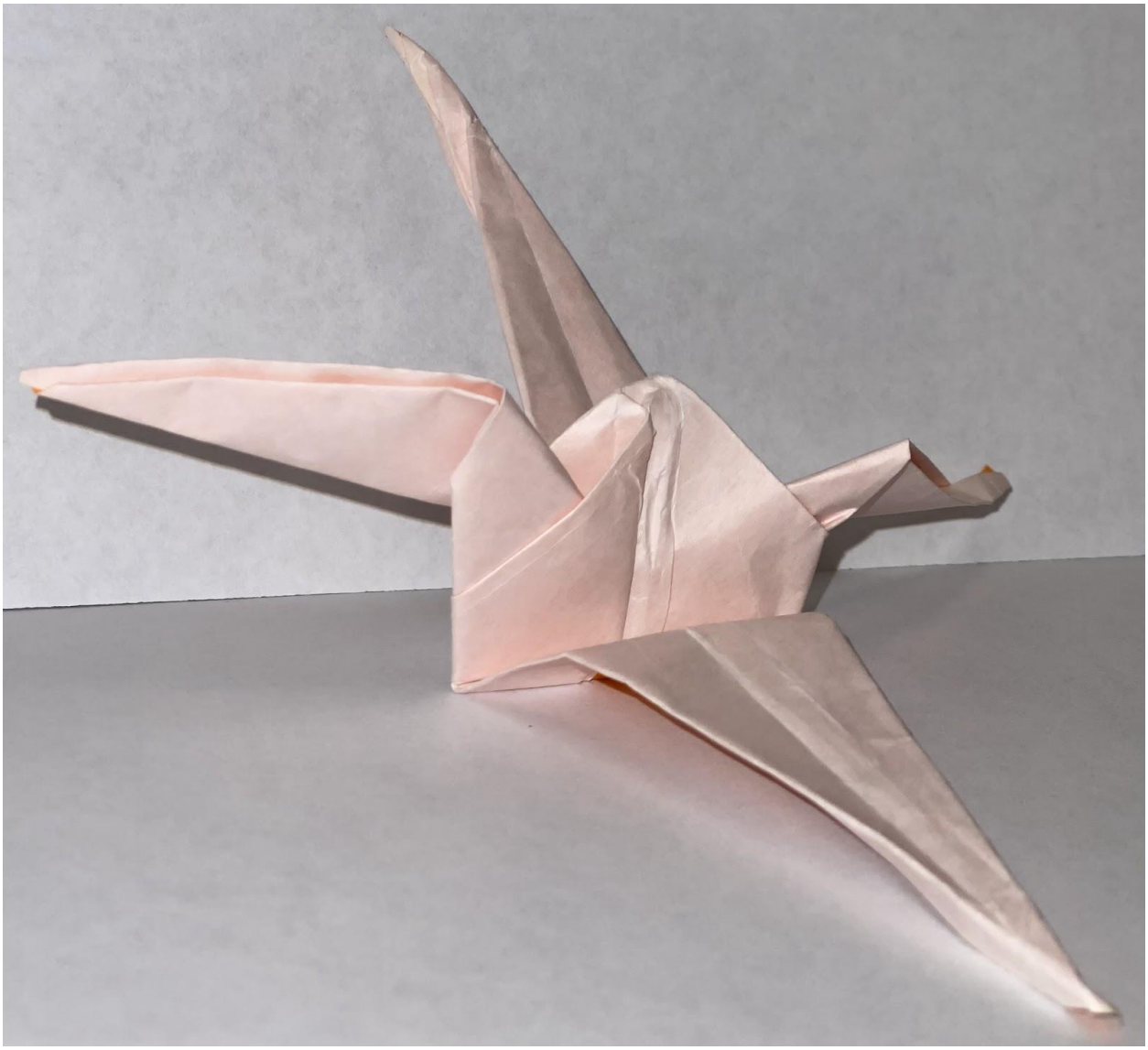
Note. This figure is a comparison of the average change in each condition.

Figure 3



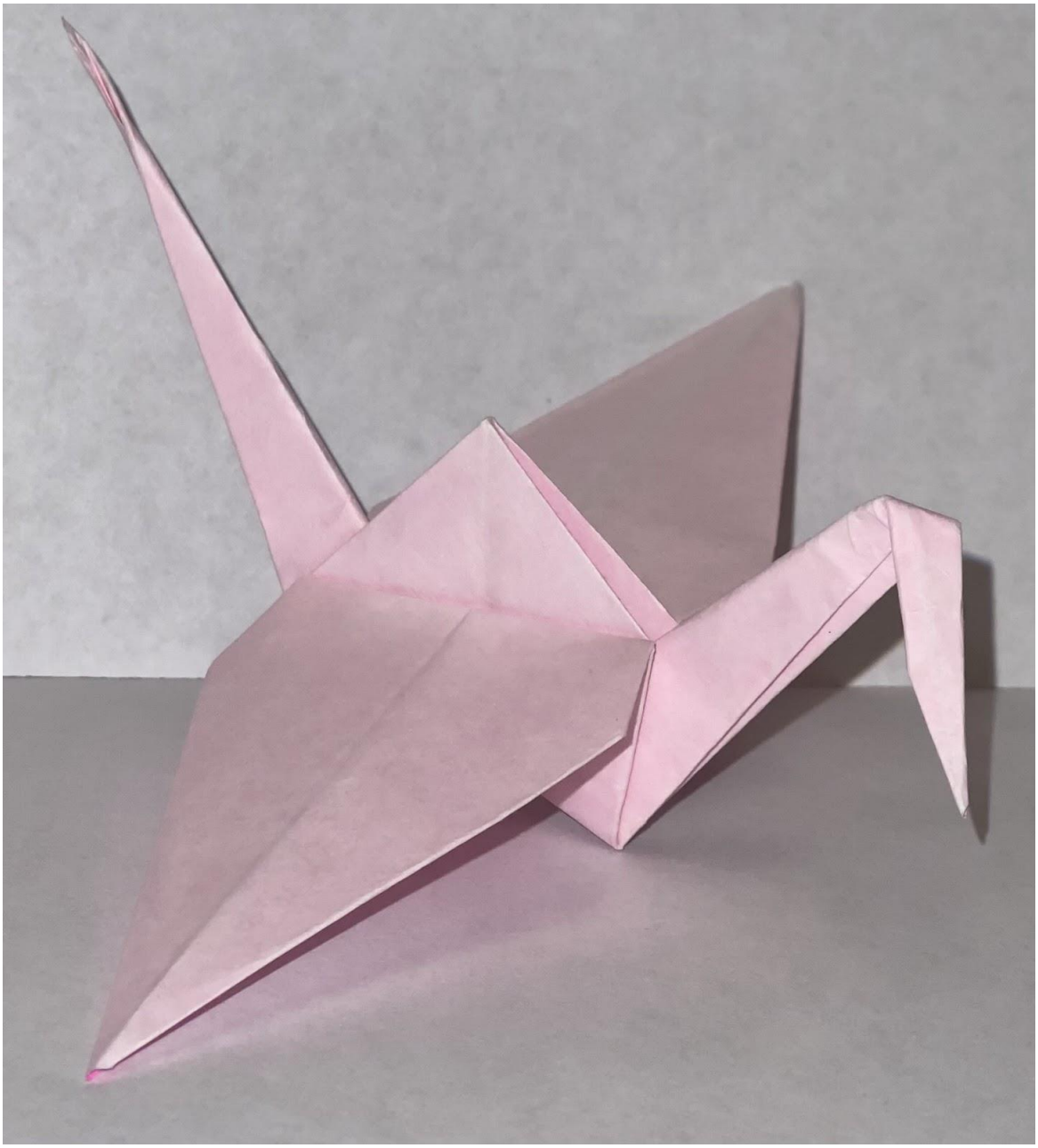
Note. Participant O14. White/Caucasian 67-year-old female. 12 point increase in state anxiety score.

Figure 4



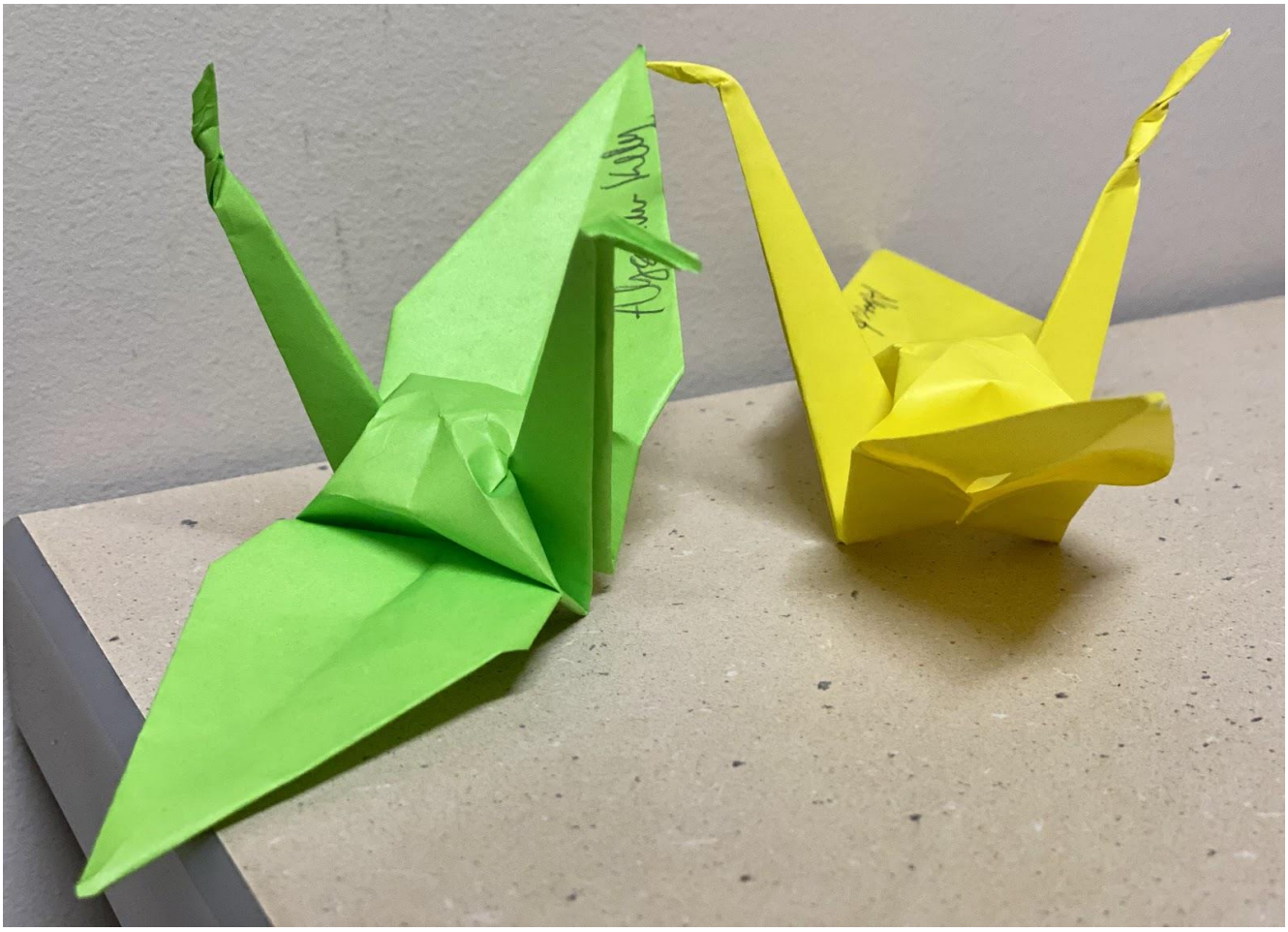
Note. Participant O15. White/Caucasian 72 year old female. 4 point increase in state anxiety.

Figure 5



Note. Participant O13. White/Caucasian 26 year old female. 7 point decrease in state anxiety score.

Figure 6

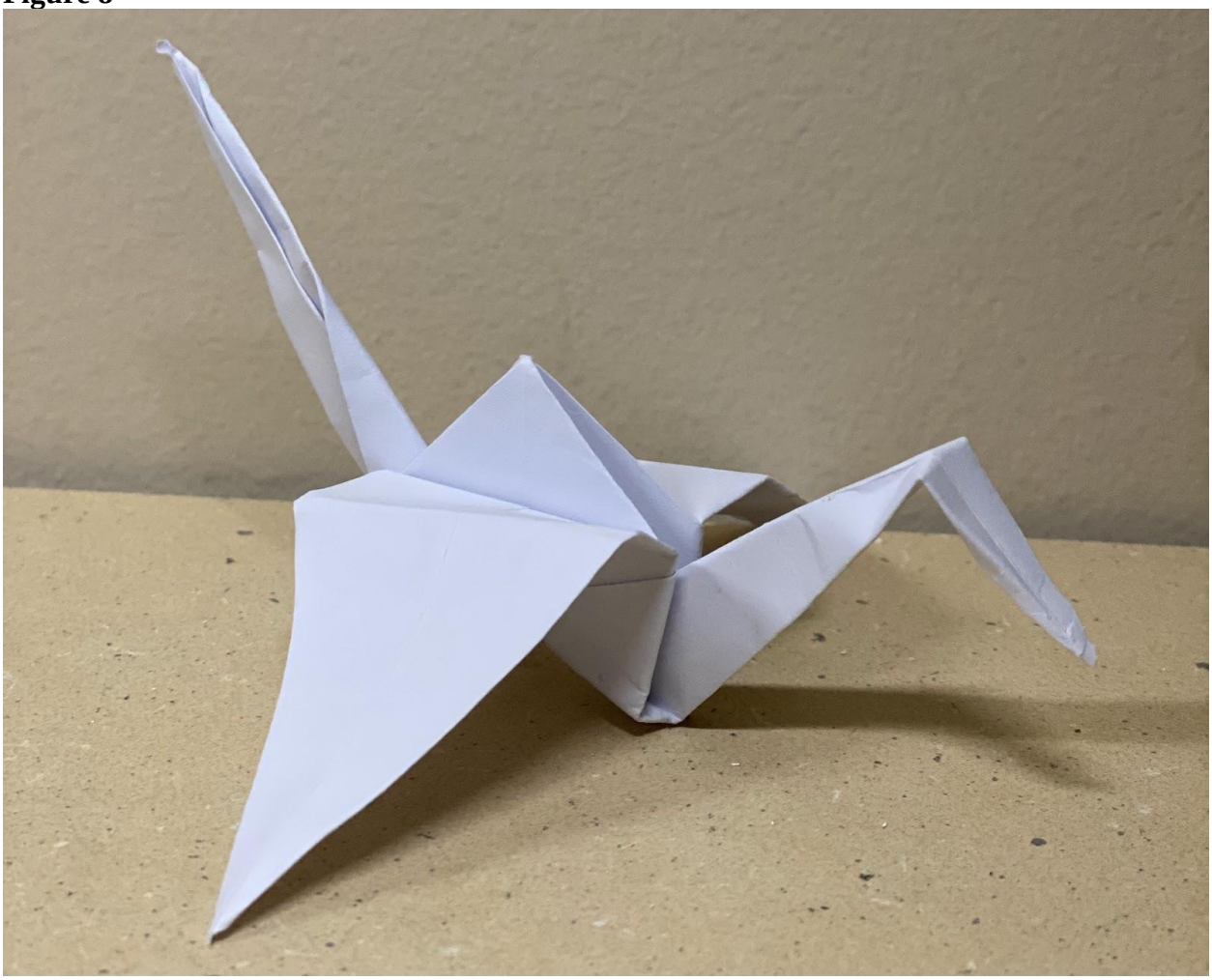


Note. Participant O10. White/Caucasian 18 year old female. 29 point decrease in state anxiety score.

Figure 7

Note. Participant O11. White/Caucasian 40-year-old female. 13 Point decrease in state anxiety score.

Figure 8



Note. Participant 07. Hispanic/LatinX 18 year old female. 0 Point change in anxiety score.

Appendix A
Recruitment Flyer

Appendix B
Informed Consent

Informed Consent Form:

This study is being conducted as part of the requirements for the completion of the Masters of Arts in Art Therapy and Counseling degree at Albertus Magnus College. The purpose of this study is to investigate the effects of art making and emotional states.

During this study you will be asked to complete a demographic form and questionnaires involving an emotional state and take part in an art making activity. Following the art making, there will be a brief discussion about the process. Participation in this study is confidential and is expected to take approximately 60 minutes. Any discussion and artwork will remain private and confidential without the use of your name. Please note that art abilities are not a factor and will not be considered.

This is a completely voluntary study and if for any reason you would no longer like to participate, you are welcome to withdraw at any time. There are minimal anticipated risks for participating in this study. Such as possible discomfort during the art making. Benefits of this study may include enjoying art making and assisting a graduate student in the completion of her thesis requirement, as well as contributing to the field of art therapy. The Institutional Review Board (IRB) at Albertus Magnus College has approved this study.

Please inform the researcher if you have any allergies to art materials. If you have any questions or concerns about this study you may contact the following individuals:

The Investigator:
Lily Mudre
lamudre@albertus.edu

Art Therapy Advisor:
Rebecca Arnold
Ph.D., ATR-BC CLAT
rarnold@albertus.edu

Psychology Advisor:
Stephen Joy, Ph.D.
sjoy@albertus.edu

Or:
Joshua Abreu, Ph.D. Chair of IRB
jabreu1@albertus.edu

Your signature below indicates that you are above 18 years of age or older, have read and understand the description of the study, have had all your questions addressed, and are willing to participate.

Name (print): _____

Signature:_____ Date: _____

___ I received a copy of this form for my record.

Appendix C
Image Release Form

Image Release form:

You are being asked to allow the investigator to photograph your artwork to be used for educational purposes. Please note that the artwork that you create during this study will remain confidential. Photographs of the artwork will only be taken with your consent and will not contain any identifying information.

Please check off your preference below in regards to your artwork:

☐ I agree that photographed images of my artwork can be used for educational purposes including publications, presentations at professional conferences, or for training purposes.

☐ I agree that photographed images of my artwork can be used for educational purposes including presentations at professional conferences or for training purposes, but not for publications.

☐ I agree that photographed images of my artwork can be used for educational and training purposes.

☐ I do not give permission for my artwork to be photographed for any of the above purposes.

I hereby give consent as noted above for the use of my artwork.

Name (print): _____

Signature: _____ Date: _____

___ I received a copy of this form for my record

Please note that once images have been disseminated publicly, they may be difficult or impossible to obtain should you change your mind.

Appendix D
State-Trait Inventory Form Y-1

SELF-EVALUATION QUESTIONNAIRE STAI Form Y-1

Please provide the following information:

Name_____Date_____S_____

Age_____ Gender (*Circle*) **M** **F** T_____

DIRECTIONS:

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel *right* now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I feel strained	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel satisfied	1	2	3	4
9. I feel frightened	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel indecisive	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel confused	1	2	3	4
19. I feel steady	1	2	3	4
20. I feel pleasant	1	2	3	4

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STAIP-AD Test Form Y
www.mindgarden.com

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Appendix E
Demographic Form

Demographics

1) **Please indicate your age:_____**

2) **What is your gender? (select all that apply)**
__ Man
__ Woman
__ Non-Binary
__ Genderqueer
__ Transgender
__ Self-Describe _____
__ Prefer not to indicate

3) **How do you currently identify your race/ethnicity? (select all that apply)**
__ African American/Black
__ Asian/Asian American
__ Hispanic/Latinx
__ Native American/Indigenous
__ White/Caucasian
__ Self-Describe_____
__ Prefer not to indicate

4) **How often do you create any form of art?**
__ Frequently
__ Occasionally
__ Rarely
__ Never

5) Have you ever created origami before?
__ Frequently
__ Occasionally
__ Rarely
__ Never

Appendix F
Debriefing Form

Thank you for your participation! This form is intended to inform you about the goals of this study. This study was conducted to explore the possible therapeutic benefits of creating origami to alleviate anxiety. Research has shown that creating origami as a mindfulness activity has resulted in benefits for both the mind and body. For this study, participants were randomized into two conditions (a control group in which no art was created and an experimental group instructed to create origami). The State-Trait Anxiety Inventory was used to measure levels of state anxiety.

It was hypothesized that individuals creating origami would show a greater decrease in state anxiety than those in the control condition. Please refrain from sharing the details of the study with others. It is possible that having this knowledge before testing may distort responses to the measure.

If you'd like to be notified of the results of this study, please note your email address. The researcher can only provide aggregate results, not the individual outcomes.

Once again, your participation and time it is greatly appreciated. Thank you!

Appendix G
Origami Instruction Video

https://www.youtube.com/watch?v=GC_Szxdqh2Y